A Horizontal Test Cryostat for Single SRF Cavity

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Give High Priority to a Horizontal Test Cryostat

- There is a need in the US for an R&D facility for testing “dressed” single cavities in a horizontal dewar
  - Complementary to vertical test capabilities at other labs
  - Envisioned as part of plans for R&D facility at Fermilab’s Meson Lab
  - Needed in spring of 2006 for tests of 3.9 GHz dressed cavities

Purpose of Single "Dressed" Cavity (with Helium Vessel, Tuner, Couplers, etc.) Testing

- Check tuner and cavity tuning stability
  - Tuner and piezo performance
  - RF passband mode measurement
  - Verify fundamental frequency at 2 K
- Test and process fundamental power coupler
- Test HOM couplers
- Verify cavity performance and limitations
  - Absence of quenching and multipacting
  - Measure Q_0
  - Dark current
- Low level RF tests
- Long term system tests

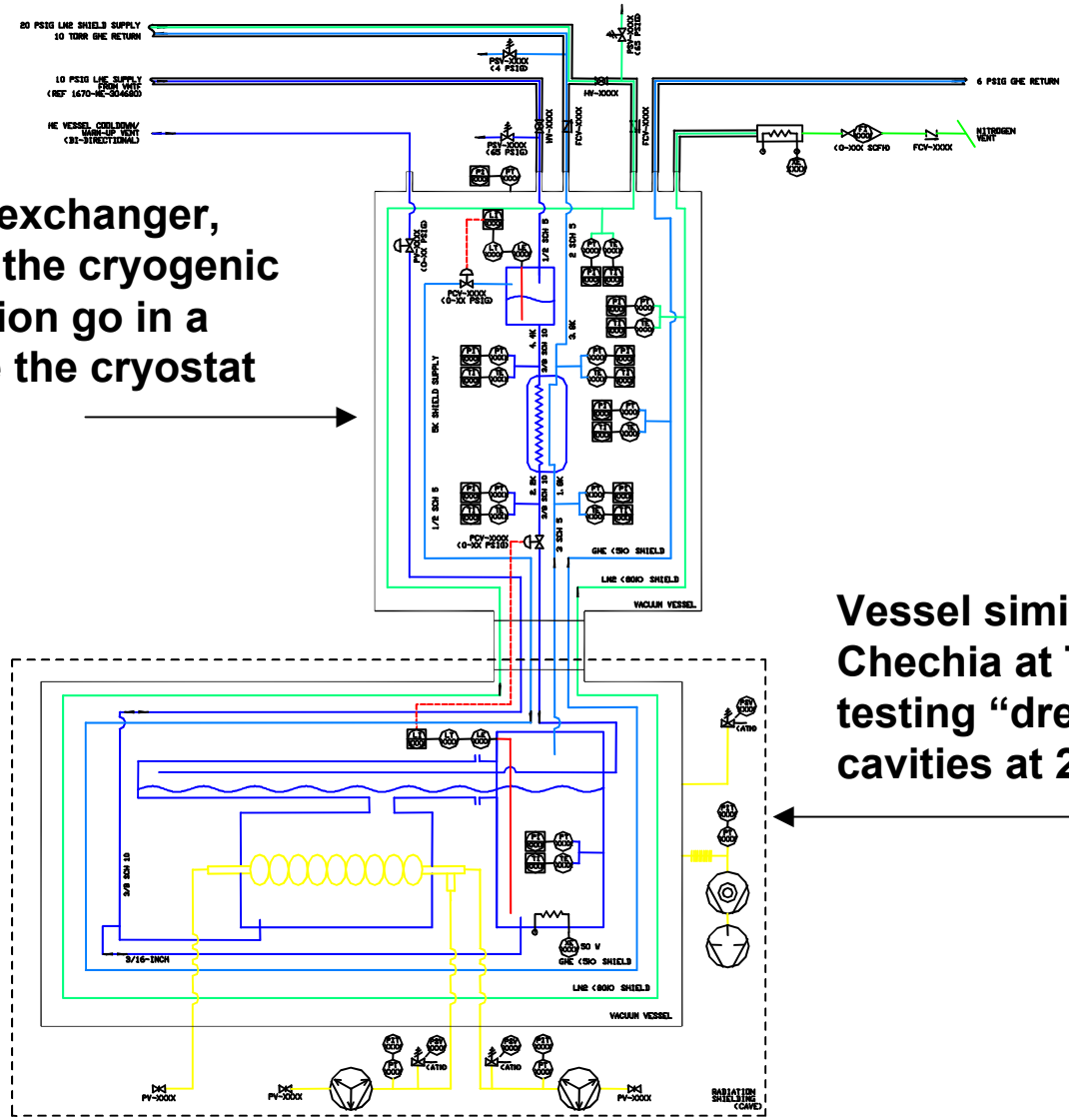
Based on Chechia at DESY, but some differences

Based on Chechia at TTF, but Some Differences

- Long-term purpose is tests of “dressed” 1.3 GHz cavities, but . . . .
- Include 3.9 GHz testing capability
- Separate cryogenic valves and heat exchangers into separate valve box
- Access from both ends
- Space for dark current measurements

PRELIMINARY
6 APRIL 2005

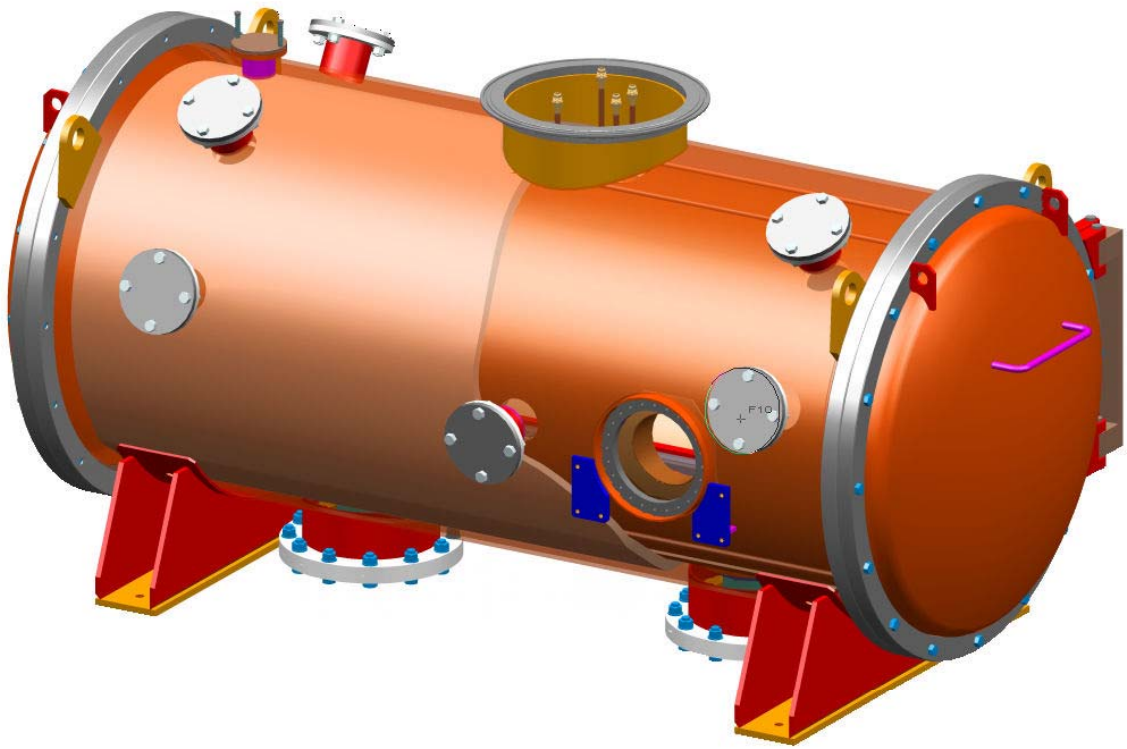
Valves, heat exchanger, and much of the cryogenic instrumentation go in a vessel above the cryostat



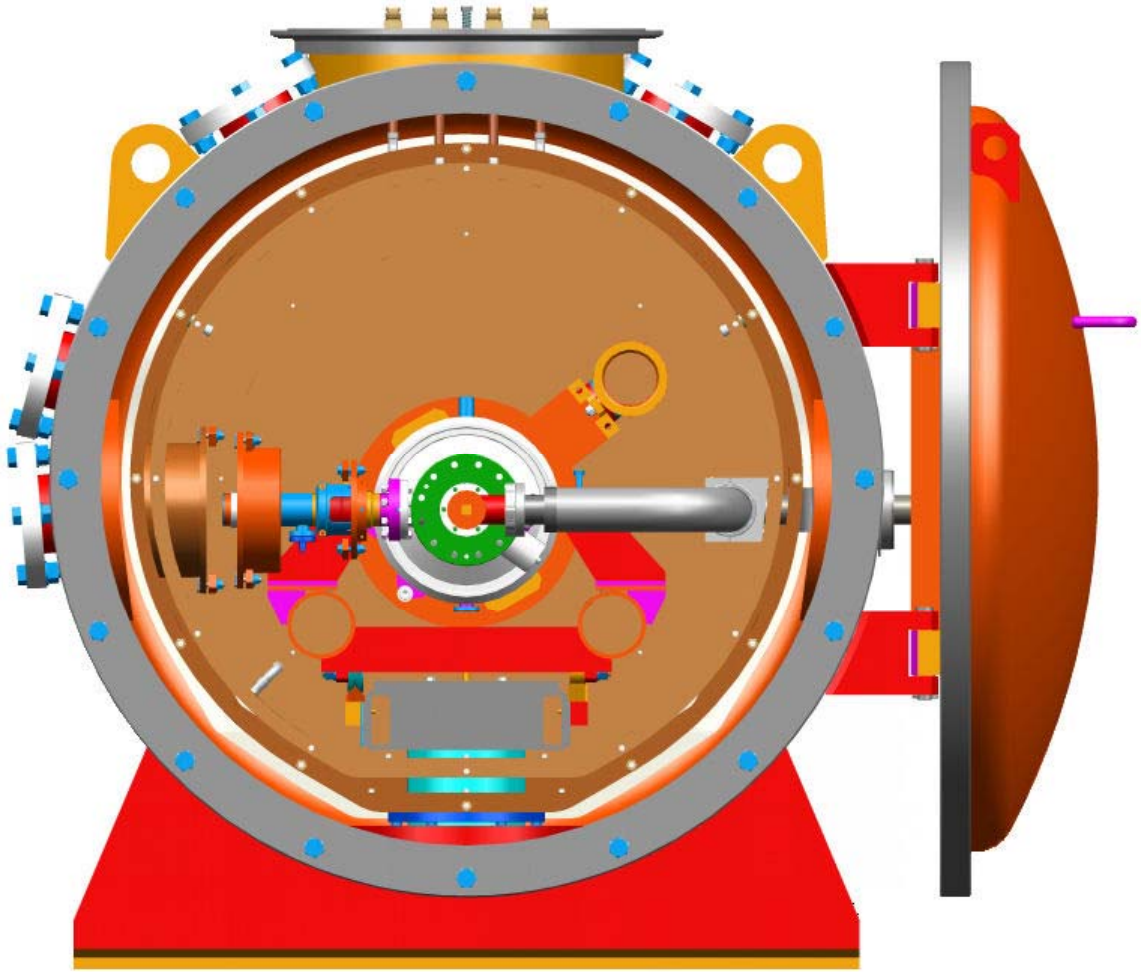
Vessel similar to Chechia at TTF for testing "dressed" cavities at 2 Kelvin

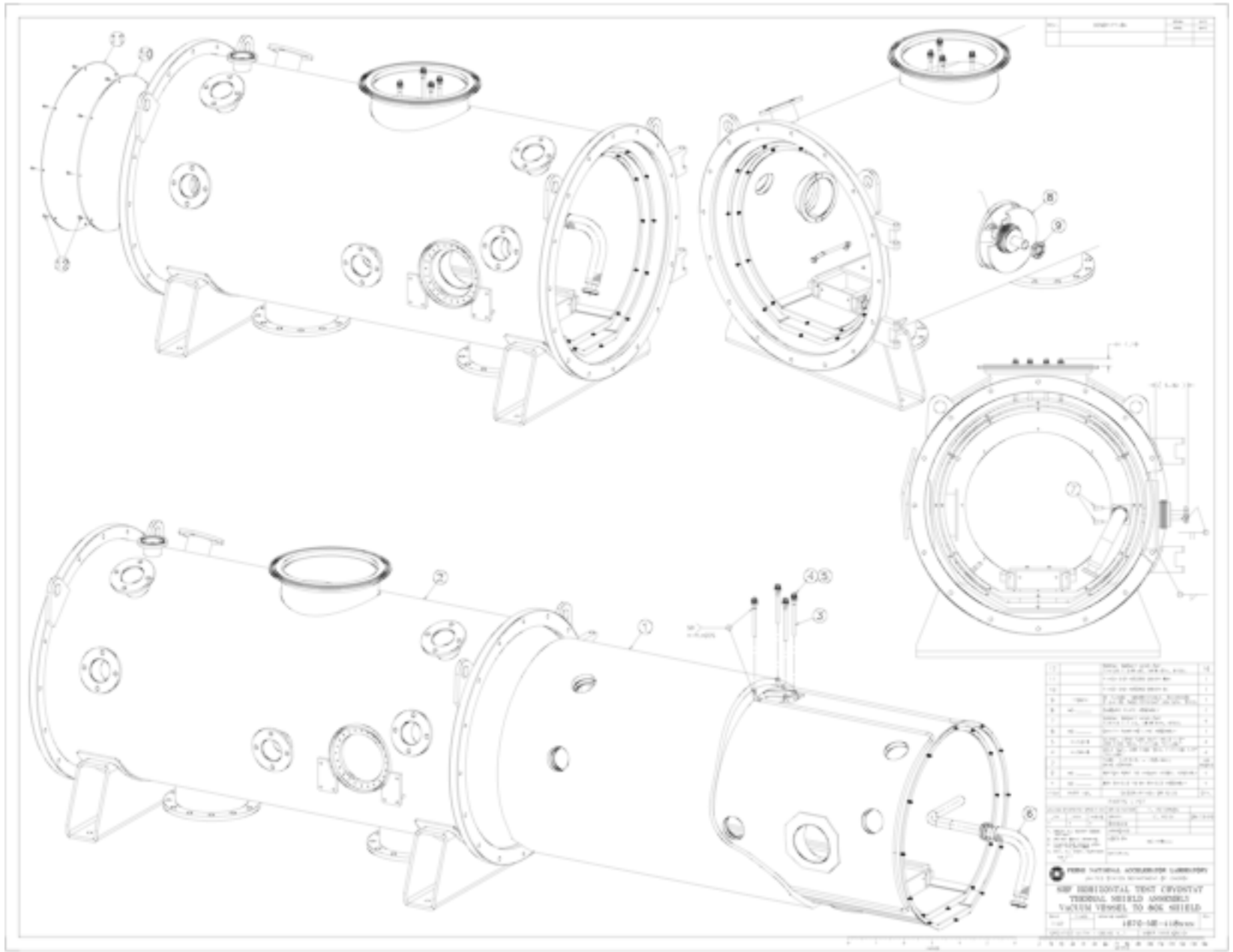
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
TD - MAGNET TEST FACILITY
SUPERCONDUCTING RF CAVITY
HORIZONTAL CRYOSTAT - P&ID
1670-ME-418280

Horizontal Cryostat Assembly
Design Is Complete



Cryostat -- End View



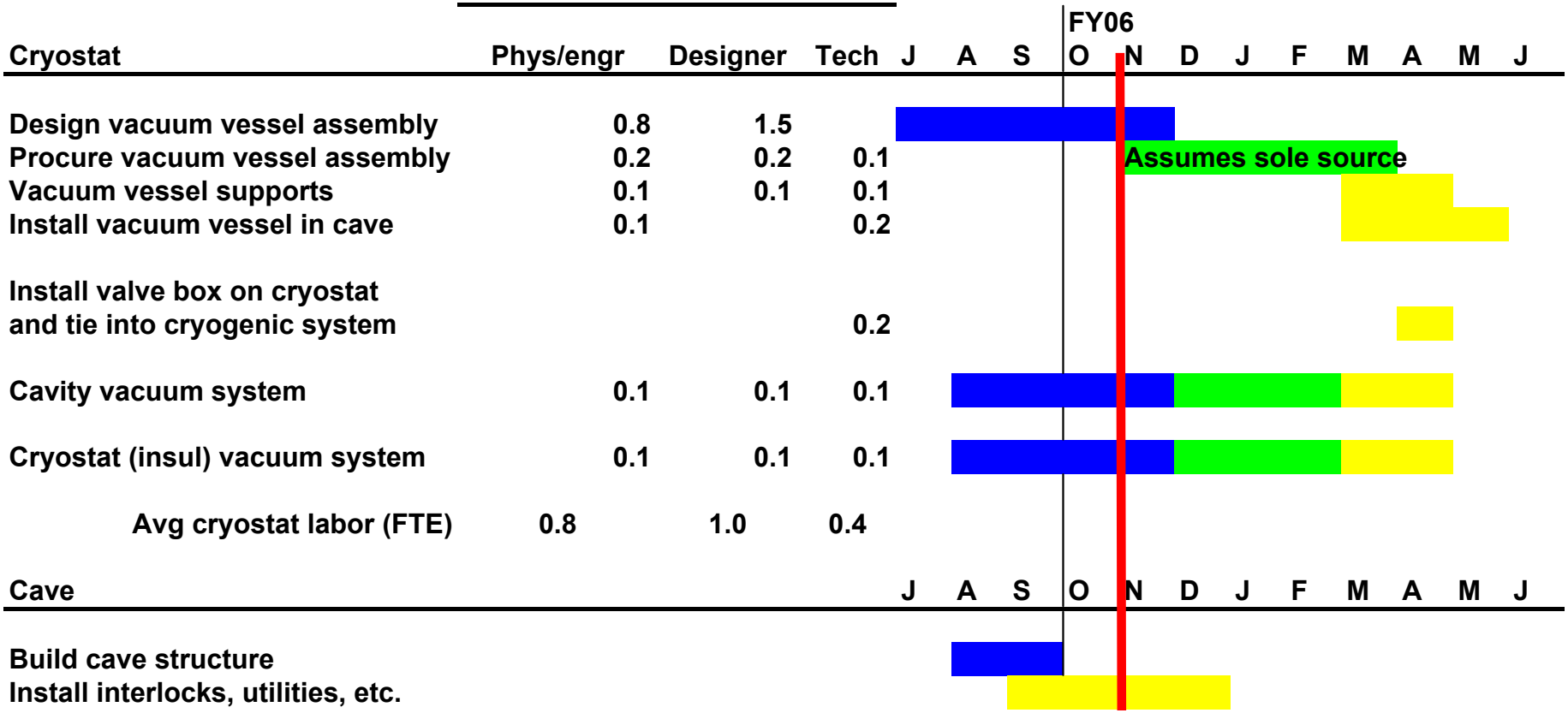

SNF HORIZONTAL TEST CRYOSTAT
THERMAL SHIELD ASSEMBLY
VACUUM VESSEL TO BOX SHIELD

Horizontal Test Cryostat Schedule and Cost Summary

- 1 November 2006 -- Design essentially complete, preparing RFQ documents
- Plan to request sole source for schedule reasons
- Estimate $120 K procurement
- Additional $30 K of miscellaneous procurements
- early March 2006 -- requested completion date for cryostat
- Estimate a few months for installation and commissioning (end of March into May, 06)

28-Apr-05
Revised 20-Oct-05

Design:
Procurement:
Assemble and commission:



Conclusions

- We are giving high priority to development of an R&D facility for testing “dressed” single cavities in a horizontal dewar
- Cryostat design for both 3.9 GHz and 1.3 GHz dressed cavities with couplers and tuners
- A four month, $120 K procurement plus various miscellaneous items
- Goal is completion in spring, 2006